Optical Detection *of* Cancer

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Preface

Improvements in cancer survival outcomes rest on early detection, elimination of risk factors and better treatment methods. Newer early detection technologies are appearing quickly and include, among others, more sensitive imaging methods, nanodiagnostics, biomarker measurements and, the subject of this book, optical detection devices. The rapid development and deployment of these devices is the result of several factors.

The first driver is the commercial opportunity to exploit biophotonic technologies that clinically recognize deep and surface — near surface cancers. While imaging and treatment techniques for the management of cancers of the upper aerodigestive system have advanced, for example, the survival outcomes have not changed significantly over the past several decades. There is a compelling need to create affordable, easy-to-use techniques that detect cancer at an early stage in all locations throughout the human body.

Second, recent discoveries in optics, physics and bioengineering has given us a better understanding of the optical, biomechanical, electrical and biomaterials properties of normal and abnormal tissue. As a result, researchers have created innovative ways to detect, amplify and display those differences with high sensitivity and specificity.

Finally, as demonstrated in the contents of this book, the tighter collaboration between global basic researchers, engineers and clinicians has accelerated the rate of biomedical innovation and resulted in faster time to market. New optical biopsy devices are appearing

with increasing frequency using a dazzling array of techniques not only to detect cancer, but to monitor the results of treatment, measure the completeness of excision in the operating room in real time, uncover invisible or satellite lesions, and predict the appearance of tobacco related cancers at distant sites.

Thanks to the efforts of the global interdisciplinary researchers and clinicians authors, using commercially available optical detection technologies will soon be the standard of care in most cancer clinics. The result will be less cost, less morbidity and patient suffering, and, hopefully, better outcomes.

I'd like to express my thanks to my colleagues from around the world who have contributed to this volume and tolerated my annoyances in getting it to press.

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